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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte RAMAN PATEL, HARRY HOWARD,
MARC CARUTHERS, TONYA MCBRIDE,
JOHN J. WOOD III, and JOHN C. ANDRIES

Appeal 2008-2801
Application 10/754,045
Technology Center 1700

Decided: January 05, 2009

Before THOMAS A. WALTZ, CATHERINE Q. TIMM, and
LINDA M. GAUDETTE, *Administrative Patent Judges*.

GAUDETTE, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1, 3, 5-11, 13, 15-17, 21, 22, and 31.¹ We have jurisdiction under 35 U.S.C. § 6(b).

¹ Claims 4, 14, 18-20, and 23-30 are also pending. Appellants' appeal from the final rejection of these claims has been rendered moot by the Examiner's decision to withdraw the final rejections of: claims 1, 3-11, and 13-31 under

We AFFIRM.

The invention relates to “thermoplastic polymer compositions, which are toughened by the inclusion of a thermoplastic elastomer component comprising a particulate rubber component dynamically vulcanized in the presence of a matrix polymer.” (Spec. 1, ll. 5-9.) The compositions are said to “exhibit properties including toughness, improved impact resistance, and improved hardness.” (Spec. 1, ll. 11-13.) Claims 1 and 11 are illustrative of the invention and are reproduced below:

1. A process for preparing a toughened polymer composition, comprising the steps of:

combining a rubber component and a matrix polymer, said matrix polymer being a polyolefin;

crosslinking the rubber component in the presence of the matrix polymer with a crosslinking agent at a temperature above the melting point of the matrix polymer to form a thermoplastic elastomer component; and

blending the thermoplastic elastomer component with a thermoplastic polyolefin polymer component to form the toughened polymer composition, said thermoplastic polyolefin polymer comprising at least 50% by weight of a homopolymer, wherein the rubber component is present in an amount from about 2 to about 60 parts by weight per 100 parts by weight of the matrix polymer and the thermoplastic polyolefin polymer component, wherein the toughened polymer composition contains less than 20 parts by weight of extender oil per 100 parts by weight of the rubber component, wherein the toughened polymer composition optionally includes a compatibilizer, wherein the toughened polymer composition has a greater impact resistance

35 U.S.C. § 112, first and second paragraphs; claims 1, 3-11, and 13-31 under 35 U.S.C. § 103 as unpatentable over Coran (U.S. 4,104,210); and claims 3-6, 13-20, and 22-30 under 35 U.S.C. § 103 as unpatentable over Coran (U.S. 4,141, 878). (See Ans. 3.) Claims 2 and 12 have been cancelled. (See App. Br., Claims Appendix; Final Rejection mailed May 31, 2006, Disposition of Claims.)

when compared to either a corresponding composition wherein the rubber component is uncured, or the thermoplastic polyolefin polymer component alone, or a combination thereof, and wherein the toughened polymer composition is substantially free of plasticizer.

11. A method for producing rotationally molded articles having toughness, comprising the steps of:

introducing a toughened polymer composition into a mold of a rotational molding device, said toughened polymer composition comprising a thermoplastic polyolefin component and a thermoplastic elastomer component comprising a matrix polymer and a crosslinked rubber component, said matrix polymer being a polyolefin, said thermoplastic polyolefin component comprising at least 50% by weight of a homopolymer, wherein the rubber component is present in an amount from about 2 to about 60 parts by weight per 100 parts by weight of the matrix polymer and the thermoplastic polyolefin component, wherein the toughened polymer composition contains less than 20 parts by weight of extender oil per 100 parts by weight of the rubber component, and wherein the toughened polymer composition optionally includes a compatibilizer; and

rotationally molding at least the toughened polymer composition above a melting point of the composition thereby forming an article.

The Examiner relies on the following prior art references to show unpatentability:

Coran	4,130,535	Dec. 19, 1978
Coran	4,141,878	Feb. 27, 1979

The appealed claims stand finally rejected as follows:

1. claims 1, 7-11, 21, and 31 under 35 U.S.C. § 103(a) as unpatentable over Coran '878 (Ans. 4); and

2. claims 1, 3, 5-7, 11, 13, 15-17, 21, and 22 under 35 U.S.C. § 103(a) as unpatentable over Coran ‘535 (Ans. 5)².

ISSUES

Have Appellants shown that the Examiner reversibly erred in concluding that:

1. Coran ‘878 discloses or suggests a toughened polymer composition containing a rubber component in the amount claimed when the composition is “substantially free of plasticizer”?

2. Coran ‘535 discloses or suggests a toughened polymer composition which “contains less than 20 parts by weight of extender oil per 100 parts by weight of the rubber component”?

3. Coran ‘878 and/or Coran ‘535 disclose or suggest forming articles from toughened polymer compositions using rotational molding?

We answer each of these questions in the negative.

FINDINGS OF FACT

- 1) Each of the independent claims includes a limitation requiring that the rubber component is present in an amount from “about 2 to about 60 parts by weight per 100 parts by weight of the matrix polymer and the thermoplastic polyolefin component” (claims 1, 11, and 21).
- 2) Appellants contend that an alternative way of expressing this limitation is “about 1.9 to about 37.5 parts rubber component per 100

² The Examiner inadvertently included claims 2 and 12 in the statement of the rejection. *See supra*, note 1.

total parts by weight of the rubber component, matrix polymer and thermoplastic polyolefin polymer component.” (Reply Br. 2.)

- 3) Appellants note that claims 6 and 16 further limit the content of the rubber component to about 4.8 to about 33 parts per 100 total parts by weight of polyolefin resin and rubber, according to the adjusted basis of comparison. (App. Br. 28 and 31.) Claims 7 and 17 (App. Br. 20, 29, and 31; Reply Br. 3) and claim 10 (App. Br. 21) recite narrower ranges of 31 and 29.5 parts rubber, respectively.
- 4) Appellants do not dispute the Examiner’s findings that the quantity of rubber component recited in claims 1, 11, and 21 overlaps the Coran ‘878 range of 35 to about 85 parts by weight of rubber component per 100 total parts by weight of the rubber and polyolefin resin components (Coran ‘878, col. 1, ll. 58-60) and overlaps the Coran ‘535 range of 25-75 % by weight rubber component (Coran ‘535, col. 2, ll. 1-5). (Ans. 6 and 7; *see* Reply Br. in its entirety.)

Claims 1 and 21 – “substantially free of plasticizers”

- 5) Appellants maintain that Coran ‘878 teaches away from a composition containing less than 50 parts by weight of rubber component when the composition is “substantially free of plasticizers” (appealed claims 1 and 21) as is the claimed composition. (Reply 2.) Appellants rely, in particular, on the Coran ‘878 disclosure that, in the absence of plasticizer, compositions having less than about 50 parts rubber component exhibit reduced toughness. (Reply Br. 2 (citing Coran ‘878, col. 2, ll. 32-38).)
- 6) Appellants rely on the Declaration of Dr. Raman P. Patel as evidence of nonobviousness. (*See, e.g.,* App. Br. 12, 25.)

- 7) Dr. Patel signed an Affidavit of Fact under 37 CFR § 1.132, on April 6, 2006 (hereinafter “Patel Aff.”). Dr. Patel is a co-inventor of the present Application. (Patel Aff. 1.)
- 8) According to Dr. Patel, based on the aforementioned Coran ‘878 disclosure (*see* FF 5, *supra*):
- products of the instant claims according to the teachings of the Coran ‘878 reference, of which I am a co-inventor, would be believed to have “reduced toughness” and would not be obvious to prepare the claimed methods and compositions, which therefore, unexpectedly, are toughened polymer compositions having improved impact resistance properties, and it would not be obvious to try to prepare such compositions based on the Coran ‘878 teachings.
- (Patel Aff. 3-4.)
- 9) The Examiner contends that the claims, as drafted, do not exclude the presence of plasticizer in the composition. (Ans. 6.)
- 10) The Examiner points out that Coran ‘878 also discloses compositions containing plasticizer (Ans. 6 (citing Coran ‘878, col. 4, ll. 36-40)) and that compositions containing as little as 35 parts by weight of rubber are described as exhibiting improved properties (Ans. 6 (citing Coran ‘878, col. 1, ll. 55-60)).
- 11) The Specification refers to “substantially free of plasticizers” as an “amount of plasticizer in the composition [which] is generally less than about 10 parts, desirably less than about 5 parts and preferably less than about 3 parts or nil, by weight per 100 total parts by weight of thermoplastic polymer and matrix polymer.” (Spec. 14:18-23.)
- 12) Coran ‘878 discloses that “[t]he quantity of plasticizer added depends upon the properties desired” (col. 6, ll. 7-8). According to Coran

‘878, addition of “20-50 parts by weight of plasticizer per 100 parts by weight of rubber” is common (col. 6, ll. 14-17).

Claims 1, 11, and 21 - “composition contains less than 20 parts by weight of extender oil per 100 parts by weight of the rubber component”

- 13) Appellants assert that, based on the Coran ‘535 disclosure, one of ordinary skill in the art would expect that toughened polymer compositions could not be achieved absent addition of extender in an amount which exceeds Appellants’ claimed amount. (App. Br. 26 (citing, e.g., Coran ‘535, col. 6, ll. 26-30 and col. 12, ll. 60-65; *see also*, Reply Br. 3-4).)
- 14) Appellants thus maintain that Coran ‘535 teaches away from using extender oil in the low amounts claimed by Appellants, (Reply Br. 4), relying on the Patel Affidavit as evidence of nonobviousness (*see* Reply Br. 3-5).
- 15) Dr. Patel testified as follows:
- the Coran ‘535 reference, of which I am a co-inventor, provides no teaching or suggestion for modifying a thermoplastic resin to produce a toughened polymer composition as claimed having the specifically claimed features and less than 20 parts by weight of extender oil per 100 parts by weight of the rubber component, and that one of ordinary skill in the art would not expect the claimed compositions to produce toughened polymer compositions, as one of ordinary skill in the art believes that adding more oil would soften the composition and thereby improve the impact resistance, whereas the contrary has been found unexpectedly to be true by the Applicants.

(Patel Aff. 3).

- 16) Coran '535 discloses that “[t]ypically, 5-300 parts by weight extender oil are added per 100 parts by weight blend of olefin rubber and polyolefin resin” (col. 6, ll. 24-26).
- 17) The Examiner finds (Ans. 7), and Appellants do not refute (*see* Reply Br. in its entirety), that this range overlaps Appellants’ claimed range.
- 18) The Examiner further finds that “[a] skilled artisan would know to manipulate the amount of extender oil” based, inter alia, on the Coran ‘535 disclosure that “‘the quantity of extender oil added depends upon the properties desired’ and . . . ‘at least in part, upon the type of rubber.’” (Ans. 7 (citing Coran ‘535, col. 6, ll. 19 et seq.).)

Claim 11 – “introducing a toughened polymer composition into a mold of a rotational molding device”

- 19) Appellants concede that Coran ‘878 and Coran ‘535 disclose forming articles using conventional techniques such as extrusion, injection, and compression molding. (App. Br. 21-22 and 30.)
- 20) However, Appellants disagree with the Examiner’s determination that one of ordinary skill in the art would have found it obvious to have formed articles from the Coran ‘878 and Coran ‘535 compositions using rotational molding. (App. Br. 21-22 and 29-30 (citing Patel Aff.).)
- 21) Dr. Patel testified that “rotational molding is substantially different than injection molding, compression molding and extrusion and presents different variables and challenges,” including comparatively high temperatures and molding times. (Patel Aff. 4.) According to Dr. Patel, one of ordinary skill in the art would not have expected the rubber component of the composition to be stable during the extended time used

in rotational molding and would have been aware that “uniform melt flow during rotational molding is a problem when utilizing rubber containing compositions.” (Patel Aff. 4.)

- 22) The Examiner is not persuaded by Appellants’ arguments or evidence, finding that “[a] skilled artisan would be apprised of suitable temperatures and would know to modify the molding temperatures to suit the particular resin employed and the object being molded.” (Ans. 8.)

PRINCIPLES OF LAW

During examination, claims terms must be given “their broadest reasonable construction consistent with the specification.” *In re Icon Health and Fitness, Inc.*, 496 F.3d 1374, 1379 (Fed. Cir. 2007). A *prima facie* case of obviousness exists where the prior art and claimed ranges overlap, as well as in those cases where the claimed range and the prior art range, though not overlapping, are sufficiently close that one skilled in the art would have expected them to have the same properties. *See, e.g., In re Geisler*, 116 F.3d 1465, 1469 (Fed. Cir. 1997); *In re Woodruff*, 919 F.2d 1575, 1578 (Fed. Cir. 1990); *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 783 (Fed. Cir. 1985). The “normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages.” *Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1168 (Fed. Cir. 2006) (citing *In re Peterson*, 315 F.3d 1325, 1330 (Fed. Cir. 2003)).

“In general, an applicant may overcome a *prima facie* case of obviousness by establishing ‘that the [claimed] range is critical, generally by showing that the claimed range achieves unexpected results relative to the

prior art range.” *Peterson*, 315 F.3d at 1330. The Board is entitled to weigh declarations expressing opinions as to fact and conclude that the lack of factual corroboration warrants discounting the opinions expressed in the declarations. *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1368 (Fed. Cir. 2004).

ANALYSIS

Appellants contend that the Examiner reversibly erred in concluding that Coran ‘878 discloses or suggests a toughened polymer composition containing a rubber component in the amount claimed when the composition is “substantially free of plasticizer.” (FF 5.) Appellants have not, however, presented arguments or evidence to refute the Examiner’s finding that Coran ‘878 discloses toughened polymer compositions containing plasticizer and a rubber component (FF 4, 9, 10) in amounts which overlap (FF 1, 2), or are sufficiently close (FF 3) to the amounts present in the claimed compositions such that one skilled in the art would have expected them to have the same properties (*see* FF 12). Appellants have not explained why the claim phrase “substantially free of plasticizer,” as interpreted in accordance with the Specification (FF 11), does not read on a plasticizer content which overlaps the range of plasticizer used in the Coran ‘878 compositions (FF 12). Nor have Appellants established any criticality in the claimed ranges of rubber component and plasticizer as compared to the prior art ranges (*see* FF 6-8).

Appellants contend that the Examiner reversibly erred in concluding that Coran ‘535 discloses or suggests a toughened polymer composition which “contains less than 20 parts by weight of extender oil per 100 parts by weight of the rubber component.” (FF 13.) Once again, Appellants have not presented arguments or evidence to refute the Examiner’s finding that Coran

‘535 discloses toughened polymer compositions containing extender oil and a rubber component (FF 4, 16-18) in amounts which overlap (FF 1, 2), the amounts present in the claimed compositions. Appellants have not shown any criticality in the claimed range of extender oil (*see* FF 14, 15).

Appellants also argue that the Examiner reversibly erred in concluding that Coran ‘878 and Coran ‘535 disclose or suggest forming articles from toughened polymer compositions using rotational molding. (FF 20.) We are not persuaded by this argument because Appellants have not provided evidence to refute the Examiner’s finding that it would have been within the level of skill of the ordinary artisan to have adjusted molding temperatures and times so as to enable rotational molding of the Coran ‘878 and Coran ‘535 toughened polymer compositions (FF 22). (*See* FF 21.)

CONCLUSION

In view of the foregoing, we conclude that Appellants have not identified reversible error in the Examiner’s rejections of claims 1, 7-11, 21, and 31 under 35 U.S.C. § 103(a) as unpatentable over Coran ‘878 and claims 1, 3, 5-7, 11, 13, 15-17, 21, and 22 under 35 U.S.C. § 103(a) as unpatentable over Coran ‘535.

The decision of the Examiner rejecting claims 1, 3, 5-11, 13, 15-17, 21, 22, and 31 is affirmed.

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

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